Journal of
Controversies in Obstetrics & Gynecology and Pediatrics

Case Report

DOI: 10.51271/JCOGP-0048

Renal CT angiography findings of bilateral double renal artery: a preliminary pediatric case report

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Cite this article: Kandur Y, Dağoğlu B. Renal CT angiography findings of bilateral double renal artery: a preliminary pediatric case report. *J Controv Obstetr Gynecol Ped*. 2025;3(2):49-50.

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Received: 12/12/2024 ◆ **Accepted**: 05/03/2025 ◆ **Published**: 11/04/2025

ABSTRACT

Double renal arteries are among the renal vascular variations. Among renal morphological variations, the most commonly encountered are variations in the number of renal arteries, with double renal arteries being the most frequent. The present pediatric case provides information on rare occurrence of bilateral double renal artery. Computed tomography angiography showed bilateral double renal artery in a 11 year old boy while investigating the etiology of hypertension. Also digital subtraction angiography confirmed the diagnosis. The case report raise the awareness among clinicians regarding the variations in the kidney's blood supply.

Keywords: Pediatric, hypertension, bilateral double renal artery

INTRODUCTION

Double renal arteries are among the renal vascular variations.[1] Variations regarding these renal arteries have been related to embryological development of vessels. Among renal morphological variations, the most commonly encountered are variations in the number of renal arteries, with double renal arteries being the most frequent.[2] Chugh et al.[3], in a study of 170 human kidneys, reported that 21.2% had double renal arteries. Similarly, Goscicka et al.[4], in a study of 140 human fetuses, found that 21.3% of the cases exhibited double renal arteries. Many studies focus on unilateral double renal arteries, but here we present a rare pediatric case with bilateral double renal arteries.

CASE

Incidental hypertension was discovered in an 11 year old boy during pre-anesthesia assessment for genu valgum surgery. He had no hypertension associated complaints and symptoms. Examination showed a pulse rate of 85 per minute, blood pressure was 200/100 mmHg. There was no radiofemoral delay and peripheral pulses were well palpable. His weight was 45 kg (>75-90p), height 143 cm (50p), BMI 22 kg/m^2. The fundus examination showed retinal arteries that indent the retinal veins suggestive of hypertensive retinopathy grade 2. Blood chemistry results were as follows: blood urea 34 mg/dl, creatinine 0.7 mg/dl, triglyceride 154mg/dl, cholesterol 172 mg/dl. Free T4 and TSH were in the normal range. Urinary microscopy and stick examination were unremarkable. Doppler ultrasound did not show features of main renal artery stenosis, however the left kidney was slightly smaller (hypoplasia). Abdomen computed tomography angiography showed normal main renal arteries, with bilateral accessory renal arteries originating from the abdominal aorta (**Figure a, b**). Decreased calibration was detected at the left renal accessory artery feeding the lower pole of the left kidney. The patient was treated with amlodipine 0.5 mg/kg and losartan/hydrochlorothiazide 50/12.5 mg. On follow up after 1 week, the patients blood pressure ranged between 138/95 and 145/96 mm Hg. A beta blocker was added (metoprolol). During his follow up period a digital subtraction angiography (DSA) was performed, which also showed bilateral double renal arteries.

Figure a, b. Bilateral accessory renal arteries originating from the abdominal aorta (red arrows)

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DISCUSSION

Knowledge of the variations of renal vascular anatomy is important in the exploration and treatment of renal trauma, renal transplantation, renovascular hypertension, renal artery embolization, angioplasty or vascular reconstruction for congenital and acquired lesions, surgery for abdominal aortic aneurysm and conservative or radical renal surgery.[5] The present case provides information on the rare occurrence of bilateral double renal artery. Dhar and Lal[6] studied the renal vasculature in 40 cadavers and revealed multiple renal arteries in 20% of cadavers, unilateral anomaly was more common (15%) than bilateral (5%). In another study, multiple renal arteries were found bilaterally in 10.2% of donors and unilaterally in 20.8%, resulting in a total incidence of 31%.[1] Bordei et al.[2] demonstrated bilateral double renal arteries in 6 out of 54 cases where double renal arteries originated from the aorta. It is important to be aware that accessory renal arteries are end arteries; consequently, during renal surgical procedures, besides hemorrhage and loss of renal parenchyma, arterial lesions may induce segmental ischemia followed by hypertension.

CONCLUSION

The presence of double renal arteries increases the complexity of renal transplantation, kidneys with double arterial supply being involved in a higher percentage of transplant failures than normal kidneys. So that arteriography should be performed in such cases. So that our case report raise the awareness among clinicians regarding the variations in the kidney's blood supply.

ETHICAL DECLARATIONS

Informed Consent

The patient's parents signed a free and informed consent form.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

The authors declared that this study has received no financial support.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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